

## PATENT ABSTRACTS OF JAPAN

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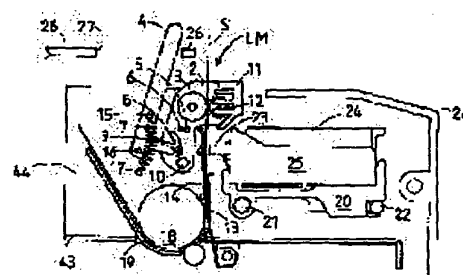
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## (54) INK JET PRINTING DEVICE

## (57)Abstract:

PURPOSE: To provide an ink jet printing device wherein a head gap can be adjusted without fluctuating a carriage fore and aft and the adjustment can easily be carried out and checked without removing a cover.

CONSTITUTION: This ink jet printing device comprises an ink jet printing head 23, a platen roller 18 for carrying a printing sheet S to a printing position, a discharge roller 3 for discharging the printing sheet S from the printing position, a spur 12 for pressing the printing sheet S against the discharge roller 3, and a roller plate 2 which axially supports the discharge roller 3 and at the same time, can be moved back and forth. Further, the device comprises an arc hole 5 and an embossed part 6 which control the moving range of a roller plate 2 and an operating lever 4 for moving the roller plate 2 fore and aft at a high lever ratio. Thus a head gap can be adjusted by manipulating the operating lever 4 with a top cover 26 mounted as it is.



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**CLAIMS**

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[Claim(s)]

[Claim 1] The ink jet printer which has the conveyance roller which conveys the print head and printed object of the ink-jet formula which is characterized by providing the following, and which breathes out and prints ink on a printed object from a delivery to the position which meets the aforementioned print head. The discharge roller which discharges a printed object from the position which meets the aforementioned print head. A press means to press a printed object on the aforementioned discharge roller. While supporting the aforementioned discharge roller to revolve, it is the roller plate which can move forward and backward.

[Claim 2] The ink jet printer according to claim 1 which has a limit means to regulate the moving range of the aforementioned roller plate, and the control lever to which the aforementioned roller plate is moved forward and backward, and is characterized by the movement magnitude of the aforementioned control lever being larger than the movement magnitude of the aforementioned roller plate.

[Claim 3] It is the ink jet printer according to claim 2 which has wrap covering for the equipment upper part, and is characterized by for the point projecting the aforementioned control lever to the method of outside [ covering / aforementioned ], and preparing it.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the ink jet printer which enabled it to check easily to what state the interval (henceforth a "head gap") of the delivery of a print head and a printing form can be adjusted easily, and it is adjusted still in detail about the printer equipped with the ink-jet formula print head which carries out the regurgitation of the ink to a printing form from a delivery.

[0002]

[Description of the Prior Art] With an ink jet printer, since ink is breathed out and printed in a printing form from the delivery of a print head, if the head gap between a delivery and a printing form is not adjusted proper, the resolution of printing will become bad, or a delivery is damaged in friction with a printing form. On the other hand, since printing may be presented with a comparatively thick thing like an envelope in addition to the usual printing form and the thickness of a printed object is not fixed, if both the printed object and the delivery are being fixed, a head gap will change with the thickness of a printed object. For this reason, it is necessary to enable it to adjust a head gap in an ink jet printer according to the thickness of the paper to be used.

[0003] What is indicated by JP,3-101948,A is mentioned as an example of the conventional ink jet printer which established the head gap adjustment mechanism for this. The important section of the ink jet printer indicated by this number official report is shown in drawing 5. The lead shaft 83 is established in parallel with the platen roller 82 which conveys the printing form 81, and it constitutes from this ink jet printer so that the carriage 86 which carries a print head 88 through the head electrode holder 87 can be moved in accordance with the lead shaft 83. The ink tank which supplies the ink for printing to a print head 88 is built in the portion of the head electrode holder 87. Moreover, the rear (method of drawing Nakamigi) of carriage 86 is supported with the guide shaft 84 which formed the eccentric cam 85 and which can be rotated. In addition, the paper-bail board 89 is attached to the platen roller 82.

[0004] In this composition, if the guide shaft 84 is rotated, the rear of carriage 86 will change a position in the vertical direction by operation of an eccentric cam 85, therefore carriage 86 will be rocked centering on the lead shaft 83. Thereby, a print head 88 changes a position into a cross direction (the inside of drawing longitudinal direction), and adjusts the interval of the front face and printing form 81, i.e., a head gap. Drawing 5 is in the state where the print head 88 was ahead moved according to the thin printing form 81. On the other hand, drawing 6 is in the state to which the print head 88 was back moved according to comparatively thick paper 90 like an envelope.

[0005]

[Problem(s) to be Solved by the Invention] However, there was a trouble of explaining below in the ink jet printer concerning the above-mentioned conventional technology. That is, since the print head in an ink jet printer needs to cope with the ink degradation phenomenon of internal ink thickening while in use, it is equipped with the head recovery mechanism for it, moves carriage to the recovery position where a print head meets a head recovery mechanism by proper frequency, and is made to perform recovery action. Therefore, you have to take into consideration not only the head gap to the printing form of a print head but the relative position to a head recovery mechanism.

[0006] However, in the ink jet printer of drawing 5, since a head gap is adjusted by making carriage 86 rock approximately, the mechanism to which this is interlocked with and a head recovery mechanism is moved approximately is needed. For this reason, the structure as the whole printer became very complicated, and had caused enlargement and the cost quantity of equipment. Or although there were some which maintained the relative position to a head recovery mechanism correctly as returned the guide shaft 84 to an original position instead of moving a head recovery mechanism approximately when carriage 86 moved to a recovery position, this required the complicated mechanism for it similarly, and had caused enlargement and the cost quantity of equipment.

[0007] Furthermore, it cannot check visually to what position since the guide shaft 84 operated for head gap adjustment so that it may see to drawing 5 is located under carriage 86 and the head electrode holder 87, it is adjusted by the ability not operating it from the upper part of a printer from the upper part, either. In addition, since an understanding is easy, drawing 5 and drawing 6 exaggerate and draw movement of carriage 86, and it cannot be overemphasized in itself [ of the head gap itself and carriage 86 / angle change ] that it is not the size which can be checked with the naked eye. Therefore, in order to carry out a check or adjustment operation of a head gap, shell plate covering of the side of a printer needed to be removed, and it was complicated.

[0008] By making this invention in order to cancel such a trouble, and enabling movement before and after an eccrisis roller Without requiring the mechanism in which the rocking mechanism of carriage is returned, in case the mechanism and carriage this [ whose ] is made to \*\*\*\* move a head recovery mechanism to a recovery position, without [ therefore ] making carriage rock approximately It aims at offering the ink jet printer which aimed at reservation of the resolution of printing, and protection of a print head as could adjust the head gap according to the thickness of a printed object. Moreover, it aims at demarcating the moving range of the eccrisis roller in that case, and enabling it to cope with a thin printed object and a thick printed object. Furthermore, it aims at enabling it to perform operation and a check of the adjustment easily from the upper part, without removing covering of a printer.

[0009]  
[Means for Solving the Problem] The print head of the ink-jet formula which this invention breathes out ink on a printed object from a delivery, and is printed in order to attain this purpose, In the ink jet printer which has the conveyance roller which conveys a printed object to the position which meets the aforementioned print head They are the discharge roller which discharges a printed object from the position which meets the aforementioned print head, a press means to press a printed object on the aforementioned discharge roller, and the thing of composition of having prepared the roller plate which can move forward and backward, while supporting the aforementioned discharge roller to revolve.

[0010] In here, it is desirable to prepare a limit means to regulate the moving range of the aforementioned roller plate, and the control lever to which the aforementioned roller plate is moved forward and backward, and to make it the movement magnitude of the aforementioned control lever become larger than the movement magnitude of the aforementioned roller plate.

[0011] Moreover, it is desirable for the point of the aforementioned control lever to project the equipment upper part outside the covering, in having wrap covering, and to be prepared.

[0012]  
[Function] In this invention which has this composition, a printed object is conveyed in the position which meets a print head with a conveyance roller, and is discharged from the position with a discharge roller. And it is pressed by the discharge roller by the press means, and the relative position to the print head of the printed object in the position which meets a print head by this becomes settled. Here, if a roller plate is moved forward and backward, the position where a printed object is pinched by a discharge roller and the press means will move forward and backward, and, for this reason, the relative position to the print head of a printed object will also change.

[0013] Therefore, if a roller plate is moved and it keeps away a printed object from a print head in moving a roller plate, bringing a printed object close to a print head, in using a thin printed object, and using a thick printed object, the interval of a printed object and the delivery of a print head can be adjusted proper, and the reservation of printing resolution and the protection of a print head by the print head will be achieved.

[0014] Moreover, since the moving range of a roller plate is regulated by the limit means, a printed object does not move too much to a print head, and the injury on a print head etc. is prevented. Moreover, the current position of a roller plate can be easily checked by the control lever which has larger movement magnitude than the movement magnitude of a roller plate, and it can be operated.

[0015] Moreover, a control lever is operated equipped with covering, since the point of a control lever was made to project outside covering of equipment, and the interval of a printed object and the delivery of a print head can be adjusted.

[0016]  
[Example] Hereafter, it is based on the example shown in a drawing, and the ink jet printer concerning this invention is explained in detail. The manual paper feed section 41 is formed in drawing 1 to the anterior part of an underframe 40 at the ink jet printer 1 shown with the whole naked state perspective diagram which removed the arm top cover, and the subframe 43 which carries the carriage 20 mentioned later, purge equipment 42, the delivery mechanism LM, etc. in the upper part of an underframe 40 behind the manual paper feed section 41 is laid. Behind [ up ] the subframe 43, the feed cassette 46 which can two or more sheet store a print sheet is attached possible [ description ].

[0017] Side frames 44 and 45 are formed in right and left at the subframe 43, the delivery mechanism LM is located

among these and purge equipment 42 is located outside. Carriage 20 is movable to the delivery mechanism LM and parallel, and the position which meets purge equipment 42 besides all the ranges that meet the delivery mechanism LM is also included in the moving range. Carriage 20 carries a print head and purge equipment 42 performs recovery action of a print head. The delivery mechanism LM discharges a print sheet [ finishing / printing ]. Moreover, the CR motor 47 which is the driving source of movement of carriage 20 is attached in the inferior surface of tongue of a subframe 43.

[0018] Next, the side \*\* view of drawing 2 explains the important section of an ink jet printer 1. Drawing 2 shows the state where the arm top cover 26 was attached to the ink jet printer 1. The platen roller 18 which conveys a print sheet S is formed in the lower left direction of carriage 20, and the ends of the shaft are held at the side frames 44 and 45 on either side. A platen roller 18 conveys the print sheet S supplied from the feed cassette 46 to a printing position by driving on PF motor which is not illustrated. And for this reason, the form guide 19 which leads a print sheet S to a platen roller 18 is formed.

[0019] The delivery mechanism LM is established above the platen roller 18. The delivery mechanism LM contains the control-lever 4 grade which operates the delivery roller 3, the roller plate 2 holding this, and the roller plate 2. The delivery roller 3 discharges the print sheet [ finishing / printing ] S from a printing position, and the ends of the shaft are held at the roller plate 2. This delivery roller 3 is formed in parallel with a platen roller 18, receives a drive from PF motor and rotates at the same periphery speed as a platen roller 18.

[0020] The roller plate 2 is for holding the axis of rotation of the delivery roller 3, moving this to a cross direction (longitudinal direction in drawing), and maintaining a head gap uniformly irrespective of the thickness of a print sheet S. In drawing 2, although only one piece is shown, since in fact holds the ends of the shaft of the delivery roller 3, a total of two pieces are prepared and these connect with the side frames 44 and 45 on either side with the roller covering 11, respectively. The roller covering 11 also has the wrap purpose for the delivery roller 3 grade which is a safe upper rotation object besides the purpose which connects the roller plate 2 of both sides. And it counterposes on the delivery roller 3 and the spur 12 is attached. The spur 12 is weakly energized with the spring which is not illustrated in order to aim at adhesion with the delivery roller 3 and a print sheet S, and if the delivery roller 3 rotates, it is \*\*\*\*(ed) by friction through a print sheet S.

[0021] This roller plate 2 is made into the rotatable the center [ the pivot 10 fixed to the side frame 44 ], and has the function for which the delivery roller 3 is moved to a cross direction (longitudinal direction in drawing) by this rotation. Drawing 2 shows the state where the delivery roller 3 was moved ahead (method of drawing Nakamigi). and - the roller plate 2 -- an arc -- holes 5 and 8 are formed an arc -- the embossing 6 prepared in the side frame 44 by fixing fits into a hole 5 -- having -- \*\*\*\* -- an arc -- the rotation range of the roller plate 2 is prescribed by when the edge of a hole 5 contacts embossing 6 an arc -- the salient 9 of a control lever 4 has fitted into the hole 8

[0022] A control lever 4 is for a user operating rotation of the roller plate 2 manually. The soffit section is attached in the lever shaft 16 prepared in the side frame 44 by fixing, and the cylindrical control lever 4 can be rotated now with manual operation. and salient 9 forms in the branch of a control lever 4 -- having -- the arc of the roller plate 2 -- it has fitted into the hole 8 this salient 9 and an arc -- rotation of a control lever 4 is transmitted to the roller plate 2 by co-operation with a hole 8 however, the arc in the formation position of the salient 9 in a control lever 4, and the roller plate 2 -- it is made for the lever ratio of the movement of a control lever 4 to the movement of the roller plate 2 to become large with the position and configuration of a hole 8 It is because it cannot recognize to a user unless it enlarges movement of a control lever 4, since the differences in the thickness of a print sheet S are very few.

[0023] The spring hook 15 is formed in the center of a simultaneously of this control lever 4, and the length spring 7 is hung. The other end of the length spring 7 is hung on the spring hook 17 prepared in the side frame 44 by fixing in the lower part position of the lever shaft 16, and the length spring 7 is in the state where it was elongated from free length. That is, the spring hook 15 is turned caudad and the length spring 7 is energizing it. It is for changing into the state where the control lever 4 was moved to either the front or back, without stopping in the mid-position. In addition, it can check in which position a control lever 4 is, attaching an arm top cover 26, since the aperture 27 is formed in the arm top cover 26 and the nose of cam of a control lever 4 was projected from this aperture 27, and the operation is possible.

[0024] Next, carriage 20 carries the print head 23 grade of an ink-jet formula, and moves this in parallel with a platen roller 18. For this reason, carriage 20 is laid in the guide bars 21 and 22 arranged in parallel with a platen roller 18 possible [ sliding ]. Although the right end is attached in the side frame 44, the left end is attached in the side attachment wall of a subframe 43 for guide bars 21 and 22 exceeding the side frame 45. It is because carriage 20 can be moved to the position where a print head 23 meets the purge equipment 42 of the outside of a side frame 45. Movement of this carriage 20 twists the CR motor 47 to the belt driving made into the source of power.

[0025] The head electrode holder 25 is laid in carriage 20 possible [ desorption ]. The print head 23 is attached in this

head electrode holder 25. The regurgitation side at the nose of cam of a print head 23 has met the print sheet S between a platen roller 18 and the delivery roller 3 with a predetermined head gap. Moreover, the ink cartridge 24 which supplies printing ink to a print head 23 is attached in the head electrode holder 25. In addition, movement of carriage 20 is only the movement in alignment with guide bars 21 and 22, and there is no movement of a cross direction (longitudinal direction in drawing).

[0026] And between the platen roller 18 and the delivery roller 3, the form guide 14 fixes to a side frame 44, and is prepared. The form guide 14 is located in the background of a print sheet S, in view of a print head 23. And the form presser foot 13 for pressing a print sheet S to this form guide 14 is formed. The form presser foot 13 is the flat spring in which the end was attached by the bottom plate of a subframe 43.

[0027] Next, the fragmentary sectional view of drawing 4 explains the attachment section to the side frame 44 of the roller plate 2. \*\*\*\* 30 for fitting in the pivot 10 of the roller plate 2 is formed in the side frame 44. And the roller plate 2 and a side frame 44 pinching the bushing 29 which is an elastic body in between, the pivot 10 and \*\*\*\* 30 fit in and are attached. This bushing 29 has a role of friction material which prevents the roller plate 2 moving freely.

[0028] Then, operation of an ink jet printer 1 is explained. Printing data origination equipments, such as a personal computer, are connected and used for an ink jet printer 1. By the platen roller 18, the print sheet S supplied from the feed cassette 46 with the ink jet printer 1 is conveyed in the printing position which meets the regurgitation side of a print head 23. It is the same when a print sheet S is inserted from the manual paper feed section 41. The print sheet S which passed through the printing position is discharged with the delivery roller 3.

[0029] In a printing position, printing is performed to a print sheet S by the print head 23. That is, a print sheet S stops in the position where the line printed meets a print head 23, according to the printing data with which a print head 23 is supplied from a personal computer etc., carriage 20 moving in parallel with a platen roller 18, printing ink is breathed out from the delivery of a regurgitation side, the ink adheres to a print sheet S, and printing is made. After printing of the line is completed, a print sheet S is sent by one line with a platen roller 18 and the delivery roller 3, and printing is similarly made about the following line.

[0030] The print sheet S in a printing position since it rotates here at the periphery speed with same platen roller 18 and delivery roller 3, a print sheet S is further pushed against the form guide 14 by the form presser foot 13 ahead from a printing position and it is behind pushed against the delivery roller 3 by the spur 12 from a printing position does not slacken, and a head gap with the regurgitation side of a print head 23 is maintained uniformly. The resolution of printing is secured by this and the print head 23 is protected from the consumption by friction with a print sheet S.

[0031] And in an ink jet printer 1, it is printable by maintaining a head gap to normal values by operating a control lever 4 according to the thickness of the print sheet S to be used, and moving the roller plate 2. The state which shows in drawing 2 first is in the state which pushed down the control lever 4 ahead, and is in the state which the roller plate 2 moved ahead. here -- the arc of the roller plate 2 -- the back end section of a hole 5 is positioned in contact with embossing 6 At this time, the delivery roller 3 is in the state which moved most ahead, and when a thin thing like the usual copy paper as a print sheet S is used, it is a position where a head gap becomes the optimal.

[0032] With this, in using a thick thing like an envelope as a print sheet S, since the part head gap of the thickness of a print sheet S becomes small and the resolution of printing becomes bad, a control lever 4 is operated and it adjusts this. namely, -- if a control lever 4 is back pushed down as shown in drawing 3 -- salient 9 and an arc -- the co-operation with a hole 8 -- the roller plate 2 -- rotating -- an arc -- it will be in the state where the front end section of a hole 5 was positioned in contact with embossing 6 At this time, the delivery roller 3 is moving back slightly compared with the case of drawing 2 . For this reason, the print sheet S in a printing position is keeping away from the regurgitation side of a print head 23 slightly compared with the case of drawing 2 . The thickness of a print sheet S is canceled by this, and a head gap serves as an optimum value.

[0033] Here, since it lengthens on the spring hook 15 of a control lever 4 and the energization force of a spring 7 is acting, a control lever 4 is pulled down by the sense of the flume gap in the mid-position. this and an arc -- positioning in each state of drawing 2 and drawing 3 is made by the contact to the embossing 6 of a hole 5 Moreover, it is prevented that a control lever 4 moves of itself and the position of the delivery roller 3 shifts. Furthermore, it is prevented by friction of the bushing 29 currently pinched between the roller plate 2 and the side frame 44 that the position of the delivery roller 3 shifts.

[0034] Moreover, since a print head 23 is an ink-jet formula and it is sometimes necessary to carry out purge operation of a print head 23, it is made to make a print head 23 meet purge equipment 42 in an ink jet printer 1 by moving carriage 20 out of the printing range by suitable frequency. Here, since there is no movement before and after carriage 20 in spite of being thin, a print head 23 has the right relative position only by [ with a thick print sheet S ] moving carriage 20 along with guide bars 21 and 22 as it is, purge equipment 42 is met, and it will be in the state in which purge operation is possible.

[0035] As explained to the detail above, in the ink jet printer 1 concerning this example Since the axis end of the delivery roller 3 which discharges the print sheet [ finishing / printing ] S was held on the roller plate 2 and this roller plate 2 was made into the rotatable to the side frame 44 The roller plate 2 can be rotated according to the thickness of a print sheet S, it can change and have the position of the delivery roller 3, the head gap of a print head 23 and a print sheet S can be corrected, and good good printing of resolution can be carried out. And since the form presser foot 13 and spur 12 which it is made for the delivery roller 3 to rotate at the same periphery speed as a platen roller 18, and press a print sheet S before and behind a printing position, respectively were prepared, a print sheet S does not slacken in a printing position, a head gap is correctly maintained during printing, and there is no friction consumption of aggravation of the resolution of printing or the regurgitation side of a print head 23.

[0036] Moreover, since the control lever 4 which operates rotation movement of the roller plate 2 was formed and the operating part was made to project from the aperture 27 of an arm top cover 26, to what position the delivery roller 3 is set can check, without removing an arm top cover 26, and this can be operated. And since the movement magnitude of this control lever 4 is farther [ than the actual movement magnitude of the delivery roller 3 ] large, a user can recognize the state easily. and the arc which fits the embossing 6 of a side frame 44 into the roller plate 2 -- since the hole 5 was formed and the length spring 7 energized towards the position which pushed down the control lever 4 on either approximately was formed, the delivery roller 3 is positioned by an advance position or the retreat position Moreover, since the attachment portion of the roller plate 2 and a side frame 44 was made to pinch a bushing 29, when the position of the roller plate 2 is held by the friction and a control lever 4 is not operated, it does not move of itself.

[0037] And since movement before and after the delivery roller 3 adjusts a head gap and there is no movement before and after carriage 20, the complicated mechanism of the rocking mechanism and others of purge equipment 42 is not required that what is necessary is just to move carriage 20 to a recovery position along with guide bars 21 and 22 as it is in the case of recovery of a print head 23.

[0038] In addition, as for this invention, it is needless to say for improvement various by within the limits which is not limited to the aforementioned example and does not deviate from the summary of this invention and deformation to be possible. for example, the front face on which it does not slide with a print sheet S although the gearing is used in the aforementioned example as shown in drawing 2 as a spur 12 -- as long as it is a character, a roller without a gear tooth may be used Moreover, although it is made to press a print sheet S to the form guide 14 by the form presser foot 13, you may make it press not to the form guide 14 but to the platen roller 18. Furthermore, you may make it the halt position of a control lever 4 have the halt position of two places and three places or more.

[0039]

[Effect of the Invention] Since according to this invention prepare a roller plate, an eccrisis roller is moved approximately, a head gap is adjusted and the printed object was pressed on this eccrisis roller by the press means as explained above Adjustment of a head gap can be performed without requiring the mechanism in which the rocking mechanism of carriage is returned, in case the mechanism and carriage this [ whose ] it is not necessary to have the mechanism in which carriage is made to rock approximately, therefore is made to \*\*\*\* a head recovery mechanism move to a recovery position. Thereby, reservation of the resolution of printing and protection of a print head are attained.

[0040] Moreover, in this invention, since a limit means is established and the moving range of a roller plate was regulated, the moving range of an eccrisis roller can be demarcated and a thin printed object and a thick printed object can be coped with. Furthermore, since a roller plate is moved by the control lever with large movement magnitude, operation and a check of the adjustment can be performed easily. Moreover, since the point of this control lever has projected outside covering of a printer, a control lever can be operated from the upper part, without removing this covering.

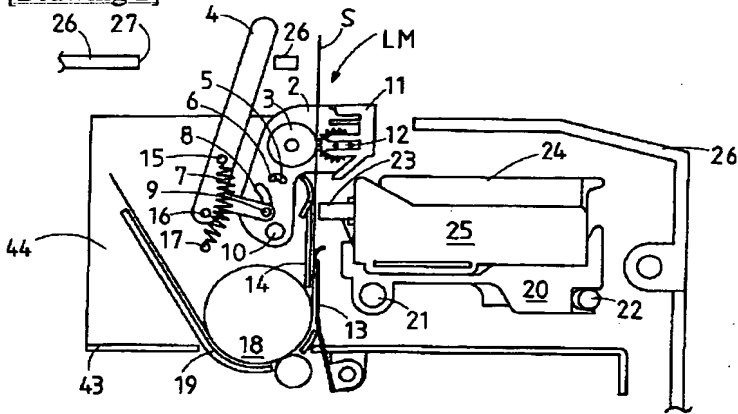
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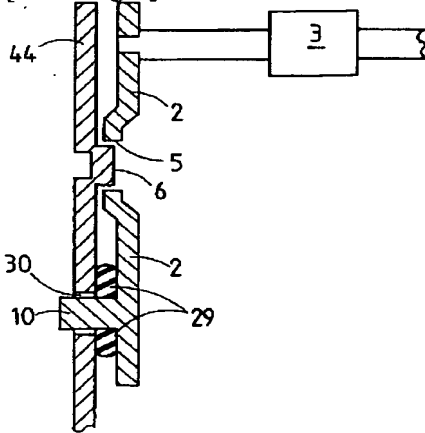
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## DRAWINGS

[Drawing 2]

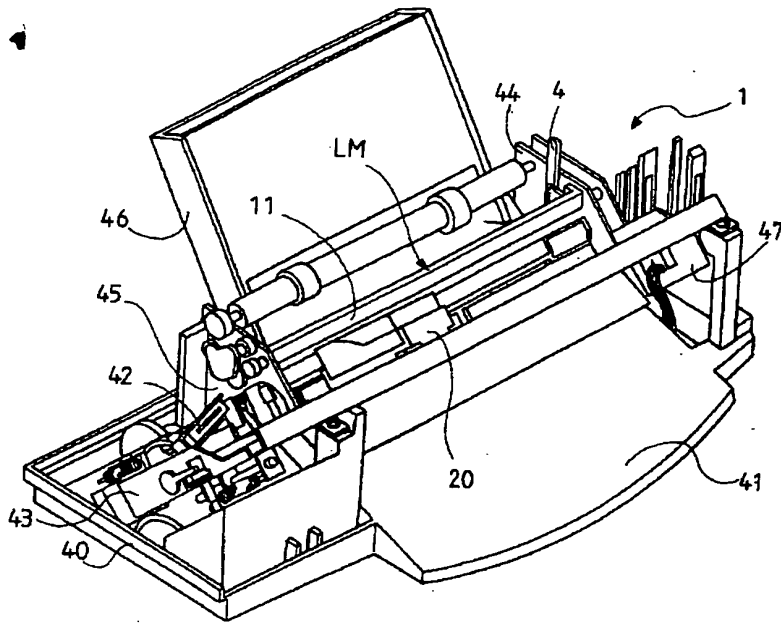


[Drawing 4]

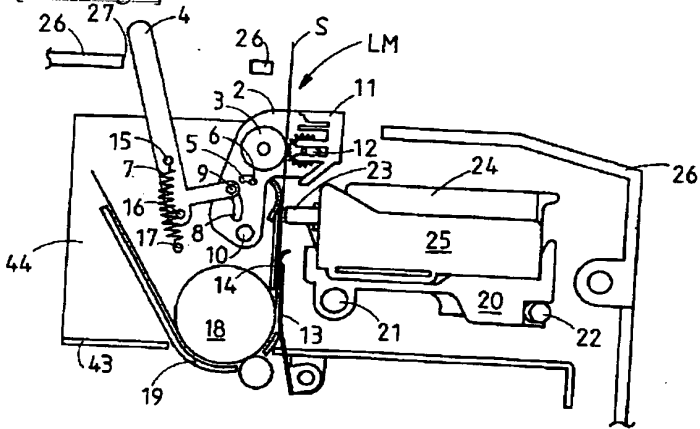


[Drawing 1]

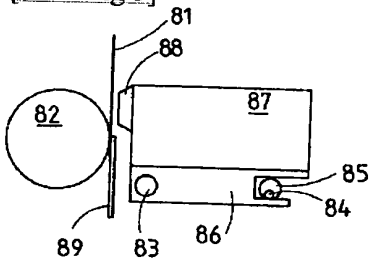




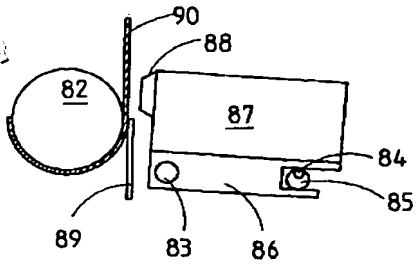
[Drawing 3]



[Drawing 5]



[Drawing 6]



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